The Excavating Engineer

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Building the Lee Highway in the Hills of Tennessee

How J. W. Gwin of Birmingham Cut Out Twenty Mule Wheeler Outfits and Tripled His Yardage with a ¾-yard Shovel

THAT section of the old Lee Highway, from Bradley County Line eastward to the city limits of Cleveland, which for years has been winding through the hills of Tennessee on its way from Knoxville to Chattanooga, will soon be a thing of the past.

This old road, with its steep grades and sharp curves, crossed the Southern Railway tracks no less than five times on a stretch of nine and a quarter miles.

Several considerations led the Highway Department to re-establish this road entirely on the western side of the railroad. In the first place the heavy traffic which has developed in recent years and the growing importance of the road as a vital link in the system was self-evident. Furthermore, the element of time saving, the consumption of gasoline, and the elimination of numerous dangerous grade crossings, were important factors.

In conformity with the best practice in highway construction this road will, for the present, simply involve a question of grading. After this new roadbed is thoroughly seasoned, contracts for surfacing will be let. The contract for the grading was awarded to J. W. Gwin, a well-known road-builder of Alabama.

Excavation

It is estimated that there are 96,000 cubic yards of common excavation, 33,000 cubic yards of solid rock, and 6600 cubic yards of borrow to be handled.

A large percentage of the excavation on this project is heavy, and, therefore, most decidedly, a steam shovel proposition.

However, there are sections where the cutting is very light, and, therefore, suited to the wheeler equipment which Mr. Gwin has operated for some time past.

One section of this wheeler equipment is now located at the Cleveland end of the road, and the other at Mineral Park.

Shovel Operation

To handle the heavy cuts and to speed up the work in general, Mr. Gwin purchased a Bucyrus 20-B steam shovel mounted on caterpillars.

This machine is equipped with a high lift boom and dipper handle, a ¾-cubic-yard dipper and a power boom hoist. It was shipped to him at McDonald on September 17, 1924, where it was unloaded and moved under its own power to a summit cut, near what is known as Section No. 158 of Federal Aid Project No. 78A.

H. F. Myers, Operator, and Lester Bowman, Fireman

This cut at the summit is about 25 feet deep, and of stiff shale, which must be drilled and shot. A mixture of 40% dynamite and black powder was first tried out for this work, but 40% dynamite is now being used exclusively.

A supply of water for this section of the work is obtained from a small reservoir created by the construction of a dam over a nearby stream, which, in spite of an unusually dry season, has proved very satisfactory.

Bucyrus 20-B in Summit Cut, looking north, with six 1½-cubic-yard Western wagons, making a fill in the immediate foreground.

This cut was 25 feet in depth at the summit.

The material was stiff shale which had to be blasted and shot.

Looking south from Summit Cut, showing section of finished highway. This picture was taken at same point as the upper view, but looking in opposite direction.

Mr. Gwin had been using a 32-mule wheeler outfit. With one shovel on the job he cut down to 12 mules and at the same time tripled his yardage and reduced his costs.

A portable gasoline pump, mounted on wheels, is used on the water line with excellent results, and coal is easily obtained from a siding at McDonald.

The general superintendent is very enthusiastic over the new shovel. Previous to the time the shovel was received, he had been using a 32-mule wheeler outfit. With the shovel he has reduced the number of mules to twelve, and at the same time he is handling approximately three times the yardage with less grief and at a greatly reduced cost.

Organization

The contractor, J. W. Gwin, of Birmingham, who is well known in road-building circles of Alabama, has placed this entire job under his general superintendent, George T. Myers, and it is safe to say that under his able management the contract will be completed in record time.

Mr. H. F. Myers is at the levers of the 20-B, assisted by fireman Lester Bowman.

George Meyers, Superintendent on This Job, Standing on the Running Board

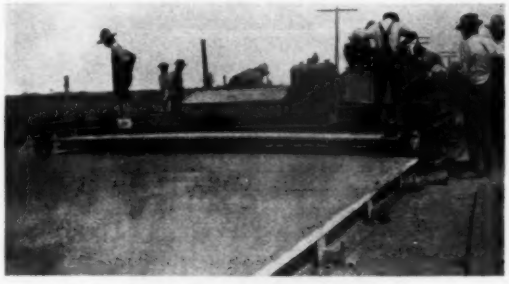
Pulling Missouri Out of the Mud

Diesel Shovel Operation on a 190,000-yard Contract for a 20-mile Concrete Highway, Involving 10,000 Yards of Rock Excavation, Tibbetts & Tibbetts of Olathe, Kansas, Contractors

IN February, 1924, a contract was awarded Tibbetts & Tibbetts of Olathe, Kansas, for the construction of a concrete highway on primary route No. 2 in Callaway and Howard Counties of Missouri, which are some 100 miles or more west of St. Louis. This piece of work is of particular interest to those interested in problems of excavation, because of the use thereon of a Diesel engine operated shovel.

The Howard County project involves 11 miles of highway 30 feet wide, while the Callaway County job consists of 9½ miles of 18-foot concrete slab 6 inches thick, both of which involve an expenditure of $135,000.

This work was started in March, 1924, and its completion is expected during this month.



Finishing Machine at Work on 18-foot Pavement in Callaway County

Excavation

The excavation in Howard County on this contract will amount to about 190,000 cubic yards, of which 10,000 cubic yards is in rock. The excavation involves overcasting, and wagon loading with an average haul of about 300 feet.

All of the 10,000 cubic yards of rock have required blasting. The drilling was done with Ingersoll-Rand Jackhamers, for which air was supplied by a Schramm 100-cubic-foot compressor.

Fills were as high as 42 feet, while cuts ran to a depth of 30 feet. At one point there was a hard rock cut of 34 feet in depth, together with some tunneling.

The rainfall in the State of Missouri during the past year was 30% above normal, which resulted in considerable trouble with soft ground. However, this was overcome by the use of wood floats under the shovel.

Concrete Aggregate Supplies

The supply of gravel for the Howard County project is dug from borrow pits, but the sand and gravel for the Callaway job is taken from a creek about five miles from the pavement.

A Section of the 30-foot Concrete Highway in Howard County Undergoing a Finishing Process

Here the contractors have erected a sand and gravel plant where the materials are screened and washed at the rate of 300 cubic yards per day.

While it is necessary to haul this material a distance of 5 miles, cement is hauled 17 miles. Twenty 2½-cubic-yard Ford trucks are employed in this work, all on pneumatic tires.

Central Mixing Plant, Foote Mixer and Ford Truck. Eighteen of these trucks are in continual operation between the plant and the pavement — Callaway County.

Shovel Output and Cost of Fuel

For this contract Tibbetts & Tibbetts purchased a new Bucyrus 30-B Diesel shovel which was shipped to the Howard County project March 10, 1924.

This machine is mounted on caterpillars and equipped with a Diesel oil engine, electric lighting equipment for night operation, and a 1-cubic-yard dipper.

Bucyrus 30-B Diesel at Work

Type of Rock Excavation Handled by the Shovel

Nosing Into Some Hard Digging

Rock Hill, Howard County — the 34-foot Rock Cut was Blasted, Then Handled by the Bucyrus Diesel Shovel

O. A. Tibbetts

Same Hill after the Bucyrus Diesel Shovel Had Gone Through

Tibbetts & Tibbetts Highway Contract in Missouri

The average output has been about 600 cubic yards per day, while the highest daily output is reported as being 1000 cubic yards. The shovel has made 5000 yards a week, with a high mark of 17,000 yards for a month's operation.

The average consumption of fuel oil is about 2 gallons per hour of 26-28 degree gravity test, which costs seven cents per gallon delivered on the job.

Based on an average daily capacity of 600 cubic yards in 10 hours, the cost of fuel oil appears to be less than a quarter of a cent per cubic yard of excavation. One gallon of lubricating oil is consumed in 10 hours.

Equipment

Besides the Diesel shovel, mentioned above, these contractors also operate an elevator grader, a Foote 21E concrete mixer, a Best 10-ton tractor,

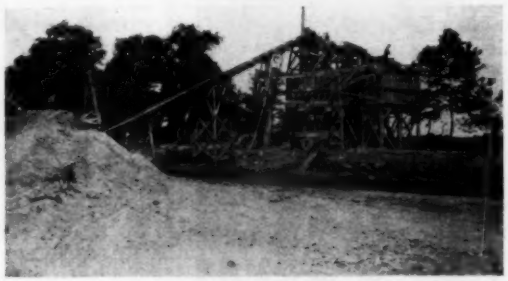
The New Road on a Side Hill Cut in Howard County

thirty-eight 2½-yard Ford trucks, and ten dump wagons, Ingersoll-Rand Jackhamer drills, and a Schramm air compressor.

Organization

Tibbetts & Tibbetts have been in the contracting field for the past 20 years. They are the largest pipe-laying contractors in the mid-coast field, having strung a total of about 5,000 miles of pipe.

Their longest job was a 10-inch line between the famous Tea Pot Dome and Frieman, Missouri, a distance of 715 miles.



Tibbetts & Tibbetts Sand and Gravel Plant in Callaway County, Missouri, where creek gravel and sand is screened and washed. Capacity 300 cubic yards per day.

These contractors are also members of the Tibbetts Construction Company, Mineral Wells, Texas, who now have under way nearly $1,000,000 in paving and grading contracts in that state.

At present Tibbetts & Tibbetts of Olathe, Kansas, have grading and paving contracts totaling $700,000, together with pipe line contracts totaling $200,000.

The officers of this company are A. E. Tibbetts and O. A. Tibbetts, both of Olathe, Kansas.

J. W. Matthews, also of Olathe, is superintendent and engineer. Mr. Matthews was formerly with the Santa Fe Railway for a period of 8 years on engineering and railroad work. He also served 9 years on general engineering and contract work.

The Diesel shovel on the job is operated by W. R. Winters and J. S. Winters.

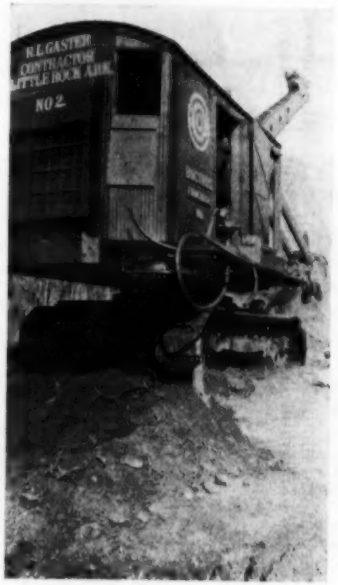
Cushman, Arkansas, Where the Diesel Shovel Started on Its Mountainous Journey

A Rough Stretch on the Route

Digging Its Own Way on a Rough Stretch

Arrival at Gravel Pit No. 1 Near Mount Pleasant, Izard County

Knocking Off the Bumps



Filling In to Make Its Own Road

Views Taken on a 7-mile Trip of a Bucyrus 20-B Diesel Shovel, Through Rough Country in Izard County, Arkansas

Riding the Rocks of the Ozarks with a Diesel Shovel

The Story of a Remarkable Journey from the Factory to the Job, Through Seven Miles of the Wildest Lands of Arkansas

ON November 1, 1924, a Bucyrus ¾-yard Diesel shovel pulled out of Evansville, Indiana, for a job in two of the most primitive counties in the State of Arkansas — namely, Izard and Fulton.

In these counties, between Salem on the north and Mount Pleasant on the south, will soon be constructed the finest road in that section, in fact the first good roads project in these counties. The contract for this highway has been awarded to R. L. Gaster of Little Rock, Arkansas.

Just 12 days after leaving Evansville this machine pulled in at Cushman, Arkansas, a little town in the center of the manganese mining district of that state, which is about 7 miles from the northern boundary of Independence County, in the Ozark Mountains, and about 7 miles from Mount Pleasant of Izard County.

The shovel was received at Cushman Wednesday, November 12th. At noon of the following day the task of unloading and erecting was started by Henry Avena, Walter Graupner and two negro helpers, under the direction of the erecting engineer, E. H. Welker. The heavy rains of Friday prevented any work being done that day, but on Saturday the work of unloading and setting up was completed.

On the following Tuesday this little digger, like the true western pioneer of old, started under its own power for the rugged wild lands of Izard County. Away she went to test the best that was in her, for a seven-mile journey like this is a terrific test for any machine.

On and up steep, rocky ways, down long, steep hills, around sharp, rock-infested curves, down embankments, fording creeks, building its own road here, and cutting its way through there, but never once in this remarkable five-day journey, although the machine was new and stiff, did she falter for a moment — the power and the stability was always there.

At several points it was necessary to break rock so that the pinion on the rear axle would clear. In other places it was necessary to blow off side rock in narrow passages so that the caterpillars might pass.

J. Russell Weil of Melbourne, Arkansas, in describing this road says: "As rough a road as possible to imagine, and still be called a road. The average time for a mountain-climbing Ford is one hour by a good driver, others don't get there."

And as for the Diesel engine, Mr. Weil, who is handling this job for Mr. Gaster says: "I spent several months during the War in submarine service, but never have I seen as sweet a running Diesel as this Atlas on our rig."

Not only is Mr. Weil enthusiastic about his Diesel shovel, but also for his Bucyrus 20-B steam shovel, which he claims has just finished loading all the gravel used in surfacing 40 miles of 18-foot roadway in Woodruff County, and although a night and day crew were employed most of the time, not a minute's time was lost on account of the shovel.

The R. L. Gaster steam machine, which he purchased in 1923, is a standard Bucyrus 20-B on caterpillars with a ¾-cubic-yard dipper, equipped to burn either oil or coal.

No. 1, Henry Avena, Operator; No. 2, Walter Graupner, Mechanic; No. 3, J. Russell Weil; No. 4, E. H. Welker, Erector; (Insert to Right) E. E. Mashburn, Project Engineer.

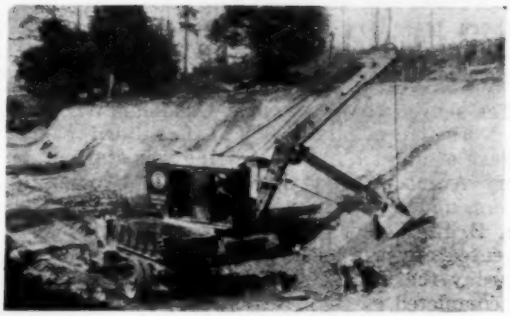
With this machine Mr. Gaster also purchased a 35-foot dragline boom, a ¾-yard dragline bucket, and a ¾-yard clamshell bucket.

Their Diesel shovel is equipped with a high-lift boom and dipper handle, ¾-cubic-yard dipper, and, like the steam machine, is also mounted on caterpillars.

This shovel will be used to load gravel from hillside pits into wagons and trucks for the highway project mentioned.

We are indebted to Mr. Weil for the information contained herein.

General View of Cut with Bucyrus 20-B Gasoline Shovel Loading Trucks



Shovel loading a truck in the foreground. Note heavy fill in background with truck dumping its load.

Heading Through a 30,000-yard Cut on the Pacific Highway Near East Stanwood, Washington

Gasoline Shovel Operation on the Pacific Highway, Washington

Performance of a ¾-yard Gasoline Shovel on State Highway Work

IN the vicinity of East Stanwood, Washington, about 50 miles north of Seattle, The Dump Trucking Corporation of Seattle will soon have completed their excavation and grading subcontract under Rumsey & Jordan for a section of state road, the Pacific Highway.

Eventually this will be a concrete highway, but, in accordance with the best practice of today, contracts have not as yet been awarded for surfacing, and probably will not be until the present grade is sufficiently seasoned to provide a dependable foundation.

This contract, involving an expenditure of $40,000, was awarded in July, 1924. Work was started August 1, and completion is scheduled for the early part of December, 1924.

Excavation Involves 50% Loose Rock

The total excavation amounts to about 65,000 cubic yards, of this approximately 50% is loose rock, which, however, must be drilled and shot. Hand-driven drills are used for driving holes from 14 to 20 feet deep. These are fired three to five at a time, using one box of powder per hole.

The greater part of the excavation is comparatively light, but there is one heavy cut of about 30,000 cubic yards.

Excavated material is used for fills, and requires an average haul of about 600 feet, except at the "big cut" where the distance increases to upwards of a thousand feet. All material is hauled by auto truck.

All cuts are 28 feet wide from shoulder to shoulder, and 47 feet from slope to slope.

Shovel Output, Cost of Operation and Performance

For this work the contractors are using a Bucyrus 20-B gasoline shovel. This machine is mounted on caterpillars and equipped with a ¾-yard dipper. It is working two shifts per day, averaging 500 cubic yards per shift with two trucks — this is maintained under rather adverse conditions. The greatest production per day was 750 cubic yards, bank measurement.

The maximum consumption of gas on this machine has been from 25 to 30 gallons per shift. Gasoline was obtained at from 15 to 17 cents per gallon. It will be seen that at an average price of 16 cents and an output of 500 cubic yards per shift, the fuel cost ran below a cent per cubic yard. Two quarts of oil are used per shift. Other costs, such as grease and supplies, are about the same as with steam power, except water which is practically eliminated. The contractors estimate that the actual operating cost of this gasoline shovel has proved to be about $600 lower per month than a steam shovel of the same size.

As for digging ability, they advise that this shovel matches a steam machine, and, furthermore, has proved itself simpler to handle, because of the elimination of the water line and the ease with which fuel and supplies can be brought up in comparison with coal.

The caterpillar mounting has proved most satisfactory. The machine has been taken over some very difficult ground, negotiating 25% grades with ease. To use the words of the contractor: "I have no hesitation in saying that it is my belief, based on performance, that this tread, with its ease of operation, simplified steering device, few parts and accessibility for oiling is unquestionably the best."

The Shovel Does the Grubbing

This roadway is being cut through virgin soil. All the grubbing has been done with this little shovel, and stumps show that the timber was heavy.

Of this class of work the contractor writes: "We have averaged an acre per shift in heavy grubbing, the shovel placing the stumps in piles to be burned, and on account of its excess of power we have found this shovel more satisfactory than the steam type for this class of work.

"As for the motor, we have had little or no trouble. We grind the valves about every six weeks. Outside of that we hardly know we have a motor. There is no extra labor attached to the gas engine in 'getting up steam' in the morning. Two minutes after the runner arrives on the job the shovel is digging.

"Competent runners are very essential, but there is no reason why a good competent steam operator cannot break in on a gas machine, and in a very few days be as efficient on a gas machine as on steam, which we have found to be the case."

Mr. J. C. Dinwiddie is superintendent, while J. Roger La Belle and George R. Crisp handle the levers.

Diesel Shovel Operation on a Pennsylvania State Highway

Description of R. H. Cunningham & Sons Contract in Indiana County, Shovel Operation and Fuel Costs

THE work on which R. H. Cunningham & Sons Company are now engaged in Indiana County, Pennsylvania, is of particular interest, because of the fact that this work involves the use of shovels powered with Diesel engines, which are being used with excellent results.

The contract, which calls for the construction of 6½ miles of concrete highway in Rayne and East Mahoning Townships, Indiana County, about fifty miles east of Pittsburgh, was awarded on August 15th to R. H. Cunningham & Sons Co. of Turtle Creek, Pennsylvania, by the Highway Department of the State of Pennsylvania on a bid of $324,662.14.

This company have had a wide and varied experience in earth-moving operations. In fact, they are one of the few concerns in this part of the country who have used a dragline excavator for stripping bituminous coal. This interesting operation was described in *The Excavating Engineer* for April, 1920. In addition to this they have to their credit over 300 miles of highways in this state.

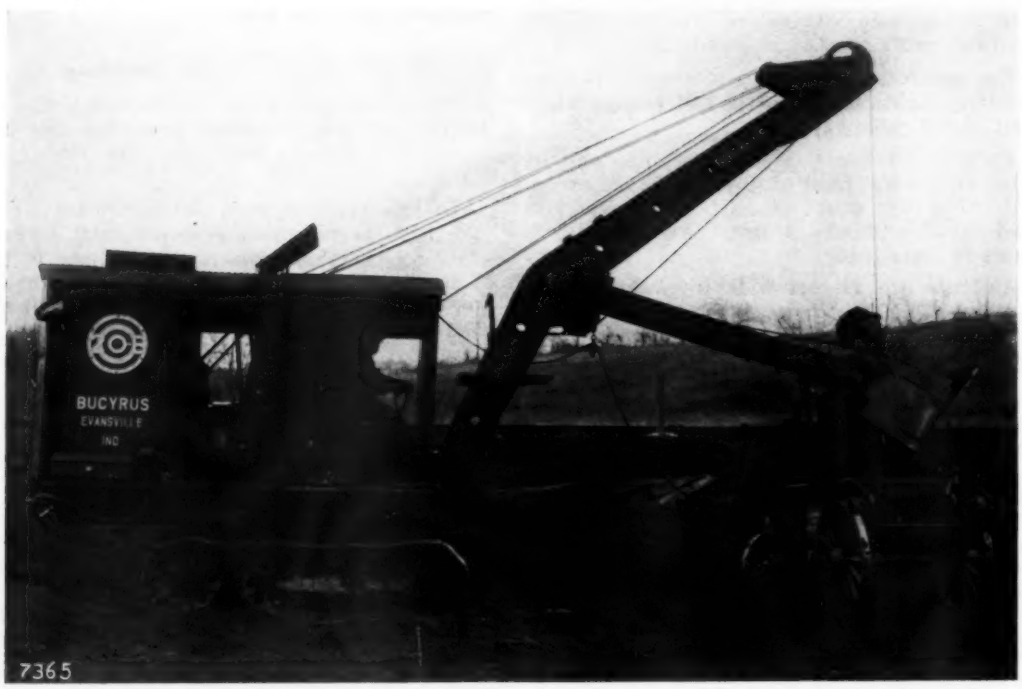
Excavation

The contract described in this article involves the construction of a reinforced concrete highway 18 feet in width, calling for 34,000 cubic yards of excavation. The material consists of shale, loose limestone and common excavation, which is being done at a flat price of $1.05 per yard without classification.

All material is loaded into wagons, the haul ranging from 500 to 2500 feet. The material is used for making fills in low swails. These fills, according to state specifications, are required to be rolled and allowed to stand in order to take care of shrinkage.

Shovel Performance

For this work, R. H. Cunningham & Sons Co. purchased two Bucyrus 20-B Diesel shovels. These machines are equipped with ¾-cubic-yard



Bucyrus 20-B ¾-yard Diesel shovel excavating for Indiana County Highways in Pennsylvania, R. H. Cunningham & Sons Co., contractors. Two of these shovels are in use on this contract.

dippers, oil engines of the full Diesel type and are mounted on caterpillars.

The shovels are reported to be operating steadily every day and giving excellent satisfaction. No delays have been experienced except for occasional minor adjustments.

They are averaging from 500 to 750 cubic yards of material per day of ten hours, depending upon the haul. This, however, does not indicate their full capacity, as the cutting was very light, which naturally shows on daily output figures.

Fuel Consumption

As mentioned above, these machines are equipped with oil engines of the full Diesel type.

The average consumption of oil is 1½ gallons per hour, or 15 gallons per day of ten hours.

This is 24-30 degree fuel oil, which costs 11c per gallon delivered at the job, which means about $1.65 per day for fuel.

On the basis of an output of 500 yards per day, this means a fuel cost of approximately 1/3 of a cent per cubic yard of material displaced.

Besides the fuel oil, 1½ gallons of lubricating oil is used on a ten-hour shift.

The amount of water used is but four gallons per week, less than a quart per day, which is hardly worth mentioning.

The contractors estimate less than 2½c per cubic yard to cover cost of fuel, lubricating oil and operating expenses.

The paving is of reinforced concrete, which is laid in standard section 18 feet wide, with a thickness of 6 inches in the center increasing to 9 inches on the edges. A Koehring type 21E mixer is being used for mixing the concrete.

Equipment

Besides the Diesel shovels and the mixer the R. H. Cunningham & Sons Co. are operating one Buffalo-Pitt and one Kelly-Springfield roller, one Orton & Steinbrenner crane, and ten wagons.

One of the Bucyrus Diesel Shovels Headed Into a Fair-Sized Cut

Personnel

Paul Beondy is superintendent on the work, with Geo. Young and Wm. E. Martin at the levers of the shovels. J. S. Cunningham is president of the company, J. S. McFeaters, vice-president, and R. J. Cunningham, secretary.

It is estimated that this work will be completed about the time this issue is in the hands of our readers.

Building a Macadam Highway into the Blue Ridge Mountains of Virginia

A 120,000-yard Job Involving 65% Rock Excavation — Shovels Replace Mules and Wheelers

THE Shenandoah Valley, nestling in the foothills of the Blue Ridge Mountains of Virginia, is one of the beauty spots of America. The scenery is unsurpassed, and here and there throughout this attractive area are numerous places of historic interest. The State of Virginia is making an active campaign to establish in this valley a national park, to be known as Shenandoah Park. This park, about an hour's traveling time from the nation's capital, will make a spot of natural beauty, comparing not unfavorably with the Yellowstone and Yosemite.

Through this section, the State of Virginia is building a modern highway from Lynchburg to Afton as part of its good roads program. At the present time an eight-mile stretch between Greenfield and Lovinston is being graded.

An 8-Mile Waterbound Macadam Highway

The final road surface, 16 feet wide, is to be four inches in depth, waterbound macadam type. This surfacing is laid on an 8-inch base course of rock, very similar to trap, loaded into small cars at a nearby quarry by convicts from Camp No. 30 close by. These cars are drawn by mules to a Reliance portable crusher plant. The roadbed is cut 30 feet at the grade line, and fills are 28 feet wide with four-foot shoulders.

A Bucyrus 20-B excavating a road through the Shenandoah Valley. At this time the 1½-cubic-yard wagons shown were making 600 trips daily, dumping on the fill 900 cubic yards in a ten-hour day. Ten wagons are serving the shovel.

A Typical Cut on the Lynchburg-Afton Highway and the Fill Made from the Material Excavated

120,000 Cubic Yards of Excavation — 65% Rock

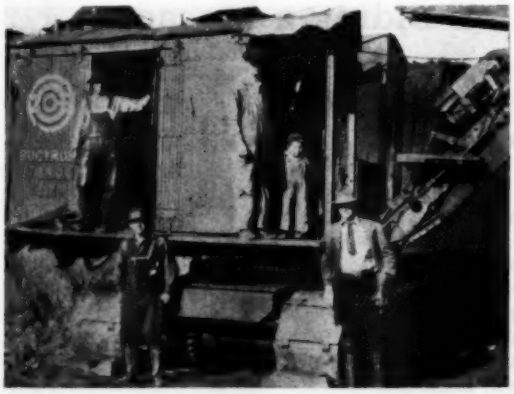
This grading calls for the excavation of 120,000 cubic yards of material averaging about 65% rock. An Erie B ¾-yard shovel came on the job in April, 1924, and in July a Bucyrus 20-B ¾-yard shovel mounted on caterpillars was dug in; at the time of writing somewhat more than two-thirds of the excavation has been completed.

The shovels are loading 1½-yard Watson and Eagle dump wagons, drawn by mules. As a rule about five wagons to a shovel are used on short hauls, but where the distance from cut to fill is great, the shovel overcasts, and material for the fill is taken from roadside pits. Preliminary levelling of the material dumped from wagons is being done by convicts. Final levelling is accomplished with an Austin Grader, drawn by a ten-ton caterpillar tractor.

After final grading, the roadbed is rolled by two ten-ton steam rollers, an Austin and a Kelly-Springfield.

Rock is drilled by two Wood steam drills and one Ingersoll-Rand Jackhamer drill. Compressed air is furnished by a 7¼-inch x 7¼-inch Schramm compressor, belt connected to a Fordson tractor.

Water is brought to the shovels by a tank cart and pumped by hand into the shovel tanks. Coal is unloaded at Afton, Virginia, and brought to the camp by the same method used for all camp



Standing by the shovel is Captain A. Hardy, assistant superintendent, with C. L. Allen, foreman, on his right. On the running board are Sam Carter, fireman, and W. T. Payne, who works the levers. "Duck" Hardy, the captain's son, is standing with Payne.

supplies — by four Packard 3-ton and one White 1½-ton trucks.

Shovels Replaced Mules and Wheelers

Captain A. Hardy, assistant superintendent, said that before this job he had always used mules and wheelers, but the coming of the steam shovel has, however, converted him, and he now would dislike to go back to the old method.

Captain J. D. Micks is superintendent in charge of all work. There are a number of bridges being built on the job, and J. Goodlow has this work under his supervision.

F. W. Davis is resident engineer on this job, and W. W. McCleevy is district engineer. C. L. Allen is foreman in charge of work done by the Bucyrus; the shovel is handled by W. T. Payne and fired by Sam Carter. W. W. Floyd is foreman on Erie's section of the work. G. V. Payne is at the levers, with H. Spencer doing his firing.

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Highway Excavation for 1925

WITH the co-operation of the various State Highway Departments throughout the United States and the provinces of Canada, *The Excavating Engineer* presents, as is its custom with this annual issue, information regarding highway excavation which will develop during the year 1925, together with the amount involving the use of excavating machinery.

As some of the states will not have appropriation available until after the first of the year, this report is not as complete as it might be. However, it is as clear and comprehensive an idea of the prospects for shovel owners as can be produced at this time.

Although these figures include Federal Aid, state and county road construction, there will, of course, be a large amount of excavation developed which is not covered in the reports received from the Highway Department.

Statistics show that gravel road construction is equal to about 40% of the total highway mileage, yet it is quite likely that gravel pit excavation, which is a big item, has not been included in the highway shovel work estimates by the various state highway engineers.

When one considers the fact that the cost of Federal Aid highway construction in the United States already aggregates more than 602 millions of dollars, and that Federal Aid projects are but a small percentage of the total road construction throughout the country, one is confronted with the stupendous magnitude of this feature of our country's development.

Alabama

No definite plans have been formulated as yet, but it is anticipated that the work to be placed under contract will involve about 5,000,000 cubic yards of excavation, of which about 30 per cent may be done with the steam shovel.

Arizona

Program not definitely determined, but it is estimated roughly that there will be about 200,000 cubic yards of steam shovel excavation.

California

The reconstruction program, together with general maintenance and betterment, will approximate an expenditure of $9,000,000. In addition to this there will be a limited program of primary construction on the interstate connections and other trunk line roads. A large grading contract of about 11 miles on the Pacific Highway, north of Redding, Shasta County, will be one of the big jobs on the ore-construction program. This involves the widening and straightening of the present grade. Much of the other reconstruction will consist of widening and thickening existing pavements. It is possible that a contract will be awarded within the next few months for a large grading job of approximately 17 miles along the ocean front in Los Angeles County.

Colorado

Definite plans have not been formulated, but it is believed that 250 miles of road will be constructed, approximating an expenditure of $3,300,000. This will involve anywhere from 300,000 to 500,000 cubic yards of excavation, of which from 10 to 20 per cent will be steam shovel work. The amount of work authorized last year which will carry into 1925 amounts to about $1,650,000, of which about 90 per cent has been placed under contract. This work involved from 100,000 to 200,000 cubic yards of excavation, of which 10 to 20 per cent was suitable for the steam shovel.

Connecticut

As yet the road construction program for 1925 has not been decided upon.

Delaware

The road construction program covers about 70 miles at a cost of about $2,000,000. This work will involve about 220,000 cubic yards of excavation, of which some 33,000 cubic yards will be classed as steam shovel work. About 68 miles of road authorized for 1925 has not been completed, and will, therefore, carry over into the 1925 program. However, the work on this 68 miles is all under contract.

Georgia

On November 1, 1924, 147 projects were under way, which involved an expenditure of $12,983,273.68. Most of this work will carry over into 1925, but definite information regarding excavation, and the projects which may be added later, are not available.

Idaho

No definite statement is available until after the session of Legislature, which convenes January 2nd. However, as the work in Idaho is done in co-operation with counties and highway districts, as well as the Federal Government, it is impossible to forecast just what shovel work will be involved, as all of their program is based upon funds available rather than definite projects, the projects being taken up from time to time as county and highway district co-operative funds are made available.

Illinois

Due to the fact that the bond issue for road construction in this state was not voted upon until November 4, it has been impossible for the Highway Commission to formulate definite plans. However, this bond issue of $100,000,000 was approved by the people, and the department is now working on extensive plans and specifications for the 1925 program.

Indiana

226.6 miles of Federal Aid projects are scheduled at $28,000 per mile. This work involves 1,150,000 cubic yards of excavation, of which 20 per cent will be adapted to the steam shovel. This does not include state or county work.

Kansas

From 300 to 350 miles of road is anticipated. It is estimated that there will be about 1,500,000 cubic yards of excavation, of which 10 per cent, or 150,000 cubic yards, will involve the steam shovel.

Kentucky

Little information available at this time. Of the work authorized in 1924 about $7,000,000 worth will carry over into 1925. This involves approximately $3,000,000 excavation cost, of which about 60 per cent, or $1,800,000, will be shovel work.

Louisiana

No information available at this time.

Maine

250 miles of highway will be constructed at a cost of about $5,000,000. This will involve about 500,000 cubic yards of excavation, of which approximately 85 per cent will be steam shovel work. There will also be an expenditure of $500,000 for reconstruction. $4,000,000 worth of work authorized last year will carry over into 1925, but contracts have been placed and excavation completed.

Maryland

The program has not as yet been formulated, and information will not be available until late in the spring.

Massachusetts

200 miles of road were built in this state during 1924, and it is expected that the 1925 program will approximate these figures. However, it is not likely that appropriations will be made before March 1st, The total expenditure for road construction, reconstruction, repairs and maintenance in Massachusetts for the year 1924 is approximately $10,000,000, and it is expected that a similar amount will be expended on the 1925 program.

Michigan

Program of construction and reconstruction approximates 500 miles of pavement and 200 miles of gravel road, which will cost around $15,000,000. County work is not included. This work will involve about 3,500,000 cubic yards of excavation, of which probably 10 per cent will call for steam shovel service. All of the 1924 program is under contract and will be completed in 1925.

Minnesota

The program has not as yet been formulated, and it is doubtful if such a program will be arranged prior to April 1, 1925.

Mississippi

There is no definite information available. It will be some time in January before the State Highway Commission will be in a position to present plans for the projects of the coming year, which begins July 1. The 1924 projects are reported as up to schedule.

Missouri

1,000 miles of hard-surfaced roads will be constructed together with 750 miles of graded earth, which will cost about $24,000,000. This involves 12,000,000 cubic yards, of which about 5 per cent will be suitable for shovel operation. Of the work authorized in 1924 600 miles will carry over into 1925. This covers 4,000,000 cubic yards of excavation, 5 per cent of which is for the steam shovel, all under contract.

Montana

The road program is entirely dependent upon legislative action, and as they do not meet until after January 1, there is no information available at this time. It is not likely that Montana's program will be definitely formulated before March 1st.

Nebraska

The program depends upon the action of the next legislative session which will be held in April. It is estimated, however, that about 2000 miles of new road will be scheduled, involving an expenditure of about $10,000,000. The total excavation will be around 4,000,000 cubic yards, of which a small percentage will be available for the steam shovel as this is a prairie state. There will also be a maintenance fund of about $1,000,000. The work authorized for the year 1924 is practically all completed.

Nevada

Approximately 120 miles of road will be constructed at a cost of $1,450,000. This work will involve about 750,000 cubic yards of excavation, of which some 200,000 cubic yards will require shovel operation. $2,500,000 of road work authorized in 1924 will carry over into 1925. Contracts have been placed for all of this work, and the excavation is practically completed.

New Hampshire

The program will involve approximately 100 miles road construction and reconstruction. The total excavation will amount to about 102,500 cubic yards of which some 25,000 cubic yards will be suitable for steam shovel service. 60 miles of Federal Aid roads scheduled for 1924 will carry over into 1925. This work covers 240,000 cubic yards of excavation, of which about 50,000 cubic yards will be shovel work. All of this 60 miles is now under contract.

New Jersey

The full program of road construction has not as yet been adopted by the State Highway Commission. However, several projects have been approved for which plans and specifications are now being prepared. These projects will total approximately 45 miles. There will be very little excavation as the present lines of highway will be followed. It is expected that the 1925 construction will also include approximately 65 miles of general highway construction, together with a considerable portion of what are termed major projects, namely, the approaches to the Delaware River Bridge at Camden and the Hudson River Vehicular Tunnel at Jersey City.

New Mexico

No information will be available prior to March 1.

New York

Nearly 400 miles highway will be constructed at an estimated cost of $20,000,000, involving 4,800,000 cubic yards of excavation, practically all of which will be steam shovel work, 50 per cent for large shovels and 50 per cent for small shovels. The reconstruction work depends upon legislative action, but will probably involve about $10,000,000, about 60 per cent of which will be suitable for small shovels.

The above is based on a tentative program. The action of the Legislature on appropriations may revise this program materially.

North Carolina

800 miles of new road will be constructed at a cost of $15,000,000. This work involves an excavation of about 4,000,000 cubic yards, of which 40 per cent is shovel work.

North Dakota

Federal and State Aid highway construction, approximately 450 miles, at a cost of about $1,600,000. No information available in regard to county work. The excavation involved in the above will amount to about 2,700,000 cubic yards, of which 25 per cent is steam shovel work. There will be no reconstruction, but 420 miles of highway authorized in 1924 will carry over into 1925. This work involves an excavation of about 2,500,000 cubic yards. The latter is being placed under contract as this article goes to press.

Ohio

About 500 miles of road will be constructed at an approximate cost of $15,000,000. This work will involve the excavation of about 3,000,000 cubic yards at a cost of $1,500,000, of which 75,000 cubic yards will involve shovel operation. There will also be an expenditure of something like $7,000,000 to cover repairs, maintenance and reconstruction. In addition to the above, 300 miles of last year's contracts will carry over for completion in 1925. This work involves an expenditure of $10,000,000 and the removal of about 2,000,000 cubic yards of excavation at a cost approximating $900,000, of which 50 per cent involves the steam shovel.

Oregon

Details regarding the selection of projects have not as yet been made, and the mileage is also an unknown quantity, but it is roughly estimated that about $4,000,000 will be spent for new highway construction during 1925. This will involve about 2,000,000 cubic yards of excavation of which 20 per cent or about 400,000 cubic yards will be steam shovel work. The work of reconstruction will amount to about $500,000 but will not be suitable for the steam shovel.

Pennsylvania

The voters of this state have approved a $50,000,000 bond issue, which if passed by the Legislature will authorize the construction of 1000 miles of highway at a cost of $52,500,000. 4,000,000 cubic yards of excavation is involved, of which 90 per cent is steam shovel work. There will be about 100 miles of reconstruction, of which about 30 per cent of the excavation will involve shovel operation. There still remains 230 miles of the work authorized in 1924 to be completed, which involves 920,000 cubic yards of excavation, 90 per cent shovel work. If the Legislature does not approve the $50,000,000 bond issue, the new road construction will be reduced 75 per cent and the reconstruction 90 per cent.

Rhode Island

No new road projects under way, but 35 miles of road will be reconstructed at a cost of $1,750,000. This work involves about 140,000 cubic yards of excavation, of which approximately 90 per cent will be suitable for the steam shovel. Of the work authorized in 1924, 13 miles will carry over into 1925. There will be 52,000 cubic yards of excavation, of which 90 per cent will be steam shovel work, all under contract.

South Dakota

350 miles of Federal Aid road construction is scheduled at a cost of $1,400,000. There will also be about 100 miles of State Aid construction involving an expenditure of $120,000, but the amount of county construction is not known at this time. For the projects mentioned above there will be a total excavation of approximately 3,125,000 cubic yards. About 80 miles of the 1924 projects remain to be completed during 1925, which involves some 578,500 cubic yards of excavation. This work is under contract.

Tennessee

The amount of construction will depend upon appropriations approved by Legislature, but it is hoped that at least $10,000,000 per year will be available for the next few years.

Texas

Projects are now under way for 1,239 miles of state highway, and 18 bridges, at a total estimated cost of $23,626,210, involving approximately 14,900,000 cubic yards of excavation. $6,000,000 will be available for repairs and maintenance.

Utah

142 miles of Federal Aid gravel surfaced road will be built, involving an excavation of 1,200,000 cubic yards, of which about 5 per cent will be steam shovel work. About $1,800,000 will be expended on reconstruction. $2,752,600 covers work authorized in 1924, 20 per cent of which will carry over into the 1925 program.

Vermont

No information available until Legislature has settled the question of funds.

Virginia

It has been estimated that available funds will construct approximately 195 miles of highway, but as yet there are no further details.

Washington

Concrete paving 100 miles, with 600 miles of gravel or crushed rock. For this work there is available about $7,000,000. Approximately 3,000,000 cubic yards of excavation is involved, of which about 30 per cent is suitable for the steam shovel. The above covers new roads, reconstruction, and the work authorized in 1924 which was not completed.

West Virginia

The people of the state are urging the sale of road bonds. If this is authorized by the Legislature, it is

the intention to construct some 680 miles at an approximate cost of $17,000,000. If this project goes through, it will involve about 6,000,000 cubic yards of excavation, of which 75 per cent is shovel work. The above covers construction and reconstruction. Of the work authorized in 1924 about 400 miles are to be completed in 1925, 4,000,000 cubic yards of excavation are involved, of which 75 per cent will be shovel work, all under contract.

Wisconsin

Federal Aid work is undetermined. Unless the Legislature provides funds over and above license fees, $1,000,000 will be available for construction, but for every dollar of Federal Aid the state is ready with $2.00. State Aid, outside of bond issue projects, will provide $785,000, which will be divided among the counties in proportion to their assessed valuation. With this the counties will put up several million dollars. The bond issue work in this state will be comparatively small as the large bond issues are practically worked out. There will probably be 100 miles of paving, as compared with 280 miles last year; several hundred miles of graded road, and from 500 to 1000 miles of gravel highway, which will vary from 2300 to 2500 cubic yards per mile to resurfacing jobs requiring but a few hundred yards per mile.

Wyoming

300 miles of road will be constructed at a cost of about $2,500,000. This work will involve about 2,200,000 cubic yards of excavation. In addition to the above, about $1,000,000 worth of contracts will carry over from the 1924 program.

Canada

Province of Quebec

As yet the road construction program has not been determined. However, there are indications that the work this year will not be heavy, due to the fact that the main trunk roads system, which has been under way for several years, is nearly completed.

Province of Saskatchewan

It is impossible to forecast the volume of work this highway department will handle until their budget has been passed by the Legislature, which is in session as this article goes to press.

Nova Scotia

105 miles of new road will be constructed at a cost of $700,000. Excavation will amount to about 420,000 cubic yards, of which very little if any will involve the steam shovel. There will also be an expenditure of $3,000,000 to cover reconstruction. Practically all work authorized in 1924 will be completed in 1925.

Prince Edward Island

No information is available regarding either new roads or reconstruction, and will not be until about March 1. 250 miles of grading was completed last year, which involved an excavation of some 500,000 cubic yards.

New Brunswick

150 miles of highway will be constructed at a cost of $1,500,000, which will involve 750,000 cubic yards of hand and team excavation.

SHOTS FROM THE FIRING LINE

Cleveland

W. F. "Blackie" Shillato is superintending the excavation for the new Cleveland Union Station for the Walsh Construction Company. H. Schnoor is general foreman on this job. This immense proposition in the heart of Cleveland entails the removal of a total of 3,000,000 cubic yards. Tom Chrisman, ably assisted by R. L. Evans, fireman, and J. P. James, cranesman, is operating a 70-C Bucyrus shovel.

Intermountain District

BY H. N. STEINBARGER AND H. H. HODDLE, DENVER, COLORADO

Platt Rogers is making rapid progress on the Pueblo Conservancy District. The shovels have made a remarkable change in the appearance of the bluff opposite the Union Station. Our friend, R. J. Champion, has been doing his share in changing the face of the earth on an Osgood.

Ask Harry Fry how to waterproof a tent. He knows how or at least how not to do it. Harry tried to mix gasoline, paraffin and fire. The first two mix finely, but the last ingredient is the fatal one, and almost proved so to Harry, and as a result of his experiment Harry has spent the better part of three months in a Colorado Springs hospital. Harry had been making wonderful progress with his 14-B Bucyrus on a dam near Colorado Springs when the accident occurred. We all wish Harry a speedy recovery and hope he will be back on his shovel soon.

Lovejoy dropped in to see us a few days ago. He has been pulling the levers for Frank Hoffman all summer. When Lovejoy works, he works, as is evidenced by his absence from our office all summer, although his job was only nine miles away. He was helping to build the new Denver Water Filtration Plant.

Northwestern States Notes

BY A. B. HANCE, PORTLAND, OREGON

Cobbs & Mitchell Company of Portland, Oregon, are contemplating building about four miles of rather heavy railroad for their logging operations, and will use in connection with this work a 20-B Bucyrus combination dragline and Diesel oil shovel.

Clark & Wilson Lumber Company, of Linnton, Oregon, expect to build several miles of railroad in connection with their logging operations at Wilark, Oregon, and will do the grading with a 20-B Bucyrus Oil shovel.

H. E. Cornell, Boise, Idaho, has been awarded a contract by the State for grading, draining and surfacing four and five-tenths miles of road on the Oregon-Idaho Highway from Homedale to the Oregon line. The bid was $15,204.75. Work will start December 10th, and be completed March 1st.

The Klamath County Court has let a contract to A. E. Doty and S. K. Messenger for clearing and grubbing of the Dalles-California Highway from a point 12½ miles south of Crescent to a point 2½ miles from that town. The clearing calls for clearing to a width of 60 feet and grubbing to a width of 40 feet. The contract was let for $650.00 a mile, and the work must be completed by May 25, 1925.

M. L. Mook, of Yakima, Washington, District Engineer, is quite convinced that the major part of his proposed road program, calling for a state expenditure of about a million in this district in the coming biennium, will be carried out. The plans include grading and graveling of 47 miles, grading 20 miles, and paving of 5 miles. The Naches Pass Highway from Cliffdell to Morse Creek, according to Mook's plans, will be graded and graveled at a cost of about $600,000 for the distance of 31 miles. The 16-mile stretch between Prosser and Benton City is to be graded and graveled at an estimated cost of $200,000. Twenty miles of Toppenish-Goldendale Road are scheduled for grading at a cost of $100,000. In addition, Mook plans to pave the two miles from Fruitvale to Nelson's Bridge, to connect with the Naches paving, and to pave a three-mile link between Zillah and Granger. These paving links are needed to complete one section of the Inland Empire Highway. The Zillah-Granger link is to be completed next spring, as money for it is available and the contract already been let.

Theo. Knudsen has been awarded the contract for the Maple-Fiddle Creek grading job. The bid was $24,740. The project is divided into two sections, involving 11,500 cubic yards of common excavation, and 26,500 cubic yards of sandrock excavation.

Pacific Coast News

BY P. H. BIRCKHEAD AND J. H. SACKETT, SAN FRANCISCO, CAL.

Plans have been completed by Chief Engineer R. B. Ball, Santa Fe Railway, Kerckhoff Building, Los Angeles, for constructing double-track system from Winslow, Arizona, to Gallup, New Mexico. Total estimated cost $3,000,000.

An encouraging piece of news in the way of new construction work is supplied by the grant of the Interstate Commerce Commission for building additional railroads in Oregon of approximately 327 miles, involving an expenditure of $16,000,000. The work contemplated comprises an extension between Bend and Lakeview, with a direct connection with the Natron Cut-off and a cross-state extension from the Malheur Junction-Harriman Branch to a connection with the Natron Cut-off, either directly or through Prineville or Bend, as a part of a railroad system between Western Oregon and California on the west and Eastern Oregon, Idaho and transcontinental territory on the east.

James Robbins called at the office last month. He was then on his way to Magdalena, New Mexcio, to operate a Bucyrus 30-B Diesel shovel for Jason Jones. Mr. Jones has two 30-B Diesel shovels in a road job near Magdalena.

L. C. Cox and C. L. Cody are operating C. R. Butterfield's 14-B Bucyrus shovel at San Pedro, California.

Dan Brady and George Wikey are manning a Bucyrus 20-B steam shovel for George Hanson at Hollywood.

R. Morris, Joe Isham and A. Z. Hall are operating a 30-B Bucyrus steam shovel for the Hauser Construction Co. at Oxnard, California.

Contract awarded to Olympian Dredging Co., 249 First Street, San Francisco, who bid as follows for constructing six miles of levee along west bank of Sacramento River in Colusa and Yolo Counties for Sacramento River West Side Levee District, Colusa: Dredge with horizontal reach of 160 feet, rental $9.91 per hour or $.0973 per cubic yard; dredge with horizontal reach of 215 feet, rental $13.08 per hour or $.118 per cubic yard.

Southern States News

BY C. N. BALLENTINE AND W. W. WHORLEY, BIRMINGHAM

The Georgia State Highway Department let several nice little jobs on December 5th. Ten miles of top-soil road in Jones County was let to J. R. & J. B. Miller of Baconton. These people were also awarded the approaches to the bridge over the Oostanaula River in Gordon County.

Contract for seven miles of sand-clay road in Wayne County was let to W. J. Bryson Paving Company, Jacksonville, Florida.

Scott-Chambers Company, West Point, Georgia, was awarded four miles of sand-clay road in Fayette County.

Scott-Chambers Company was also successful in landing eight miles of gravel road in Shelby County, Alabama.

W. H. Pattie, Birmingham, Alabama, was awarded contract for reconditioning the Louisville & Nashville Railway right-of-way in Blount County.

S. K. Jones of Memphis was recently awarded a nice piece of road work in Fulton County, Kentucky.

F. L. Busby is operating a Bucyrus 30-B for the Atlas Portland Cement Company. N. L. Daniels has been operating a Marion 28 for the Southern Foundation Company.

J. F. Murdoch and A. O. Mullis are handling whirleys on the Stone & Webster job near Halawaka, Alabama.

E. J. Haynes is in charge of T. W. Roach's tower excavator near New Madrid, Missouri.
Mr. Johnston Chapman, United States foreman, is in charge of the Government machine at this point.

Our old friend, J. D. Morris, who has recently been operating in the Tennessee and Kentucky fields, dropped in to see us recently.

Mr. E. P. Russell, superintendent of the Tennessee State Highway forces, has just completed a very heavy piece of road construction on Cumberland Mountain near Monteagle. George T. Ridge is operating a Bucyrus 20-B on this work, and it is an interesting sight to see him play marbles with five-ton boulders which he dumps over the mountainside.

The Muscle Shoals Construction Co., Sheffield, Alabama, report subdivision work in the Shoals area as active.

Geo. Hurd is handling a whirley for Geo. Turner in Memphis on subdivision work.

Our old friend, J. T. Moses, paid us a visit recently. J. T. appears to be in the best of spirits, and reported that he was headed for a whirley shovel on Charlie Cox's job in Calhoun County.

A. S. Dickson is operating the Brooks-Callaway Company's Class-24 Bucyrus dragline at Opelika, Alabama.

St. Louis Items

BY A. B. KOENIG

J. A. Durnim of the Walsh Construction Co. was with us a day. Nothing new at this time.

Cameron, Joyce & Co. have outfits at work on 5½ miles of the new Illinois Central cut-off in Southern Illinois.

James F. Bruce, for 22 years general office man of the Koenig Labor Agency in St. Louis, died November 22nd at the age of 38 years. Jimmie, as he was best

known, came to Koenig Labor Agency as a boy and grew right up in the labor business. He was considered one of the best-posted men on contracts and contractors in the central part of the country. To those of us who knew him personally he was a man and a whole-souled, big-hearted friend. To those of us who called him Jim his death comes as a blow that strikes deep at the heart.

Walter Stewart, whose headquarters are at Mt. Vernon, Illinois, reports a good 9-team outfit idle at Frederick, Illinois, that he would like to place on work immediately.

Work of placing the steel on the Piney Creek Bridge on the Fort Smith-Little Rock Highway between Clarksville and Russellville, Arkansas, will be started December 14.

W. L. Pierson of the Jennings Construction Co. says they will be through with their work on the Missouri Pacific Railroad at Kirkwood, Missouri, shortly. They want a job to place 15 teams on.

Nicholas Lamb, former president of the Lamb Construction Co., died suddenly at the home of his sister in University City, Missouri, on November 16th. He is survived by a widow and seven children residing in San Antonio, Texas.

E. W. Johnson, bookkeeper for James O'Neil, reports that they are moving their outfit on 3 miles of heavy team work on the new Illinois Central cut-off.

Graves & Bradley, Box 268, Herculaneum, Missouri, have a 20-team machine and fresno outfit idle that they can place on work immediately.

Jack Carroll, Cape Girardeau, Missouri, was in the city a couple of days looking up new work for his extensive team and concrete outfits that will be idle shortly.

John Marsch, Inc., was awarded Section 2 of the Edgewood-Fulton cut-off on the Illinois Central Railroad. This contract consists of 32 miles of heavy shovel and team work, about 2,000,000 yards in all. They have sublet the team work to Shugart & Blythe Bros., and expect to do most of the heavy shovel work with their own outfit.

Jim Fortine, Box 5, Edwardsville, Illinois, has a revolving shovel and a small team outfit idle.

J. J. Daily will be in charge of part of J. H. Flick Construction Co. work on the Illinois Central Railroad in Southern Illinois.

M. L. Windham, the popular Centralia, Illinois, contractor, was married to Miss Bettie Olson of Chicago last February. Windham was very successful in keeping this event from his friends, but it leaked out here the other day and he blushingly acknowledged that it was the truth. Congratulations and best wishes for your future happiness.

Mr. and Mrs. Michael Kingcaid, who were married at Morrison, Illinois, fifty years ago, celebrated their golden wedding at Clinton, Iowa, November 17th. Among those present at the celebration were their daughters, Mrs. R. D. Lay, Mrs. A. F. North, Mrs. Milo Finch, their sons Arthur and Mrs. Kingcaid of Chicago, Thos. Kingcaid of Terre Haute, Indiana, and Wm. Kingcaid, brother of Michael, who was present at the wedding fifty years ago.

H. R. Smith, Charleston, Missouri, has a 20-team outfit that he would like to put to work in this part of the country.

Contractors when in want of work or labor for their outfits write or wire Koenig Labor Agency, 612 Walnut Street, St. Louis, Missouri, or 501 Delaware Street, Kansas City, Missouri.

H. H. Hall Construction Co. of East St. Louis made rapid progress during the past month on various road jobs across the river, also on the flood gate they are constructing south of East St. Louis.

J. W. McMurry Contracting Co. is working full time and making good headway on their 12th Street bridge contract in Kansas City, Kansas.

Fire of unknown origin broke out at the plant of the Leach Construction Company at Kennett, Missouri, on December 6th. It wiped out the entire building and destroyed several trucks and automobiles. The extent of the loss cannot be determined with any accuracy, but is known to exceed $30,000. Among the property destroyed by the fire were eight gravel trucks and four autos, all being total losses.

Massman Construction Co. have started another shore protection job for the Missouri Pacific Railroad, making a total of three gangs they have on this kind of work on the Missouri River.

W. A. Ross Construction Co. have finished their grading job near Grandview, Missouri.

S. J. Groves & Sons Co. have outfits at work at Excelsior Springs and Sedalia, Missouri, on state highways and are making preparations to open two more camps in the near future.

Yale & Reagan Co. subbed 550,000 yards of steam-shovel work on the new Illinois Central cut-off near Harrisburg, Illinois, from the State Corporation. M. D. Huckins will be in charge on this job.

Pete Shugart & Blythe Bros. secured pretty near all of the team work on the new Illinois Central Railroad cut-off in Illinois.

We wish all our readers a Happy and Prosperous New Year.

Canada

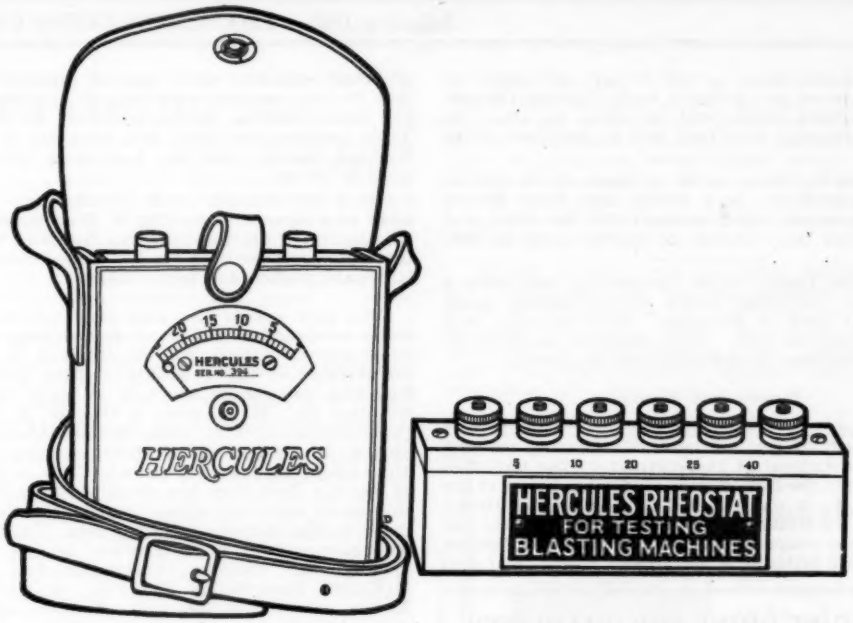
Montreal and Vicinity

BY J. M. WARD

We had a visit last week from Thos. Cozzolino of Chicoutimi, who is working for the Quebec Streams Commission doing some filling in. He has taken in an 18-B Bucyrus shovel on traction wheels, and, due to the almost inaccessible destination and the terrible condition of the road they had to take, it took them three weeks to take the shovel a mile and a half. They got it going, however, and hope to be able to do some good work yet. Mr. Cozzolino states, however, that after this he will only consider a caterpillar machine.

Anglin-Norcross, Ltd., are general contractors for the new Chateau Apartments to be erected on Sherbrooke Street, Montreal, at a cost $3,500,000. Kendall Bros. have the excavation and have made arrangements with D. Verochio Construction Co. to use their Erie shovel.

G. L. Campbell is working his Thew gasoline shovel on a 10,000-yard cut for McDonald & McLeod, a Canadian National contract. The Swedes put off a horizontal shot the other day, and shot some stones clean through the shovel doors, and burst right through the radiator of the gasoline engine. Some people have no respect for shovels.



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Breaks, short circuits, or faulty connections can be easily detected and located with a Hercules galvanometer before an attempt is made to fire a shot. This helps to prevent misfires and saves both time and money.

The Hercules rheostat is a handy and inexpensive little instrument with which the capacity of blasting machines can be quickly tested in the field.

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Wilkes-Barre, Pa.
Wilmington, Del.

UMI

It is somewhat early as yet to say just what the highway programs are going to be in Eastern Canada. This is a subject which will be taken up after the various Governments have been able to take care of the snow drifts.

One of the big items on the program of the Quebec Government, however, is a trunk line from Quebec north to Chicoutimi, which means about 200 miles, and it is understood that this will be started early in 1925.

The British Empire Steel Corporation are using a 20-B Bucyrus caterpillar steam shovel loading steam coal on their dock at Montreal. They are very well pleased with the machine. John Cleary is handling the levers, and Napoleon Mallette is doing the firing.

Toronto and Vicinity

BY N. DE WIND

The incident of greatest importance during the past month is the disposal of the contract by the Canadian Government for the construction of Section Seven of the Welland Canal. It was awarded to the Canadian Dredging Company of Midland, Ontario. Mr. D. S. Pratt, the president of the company, was a recent visitor to Toronto, but as we go to press he is not able to give a great deal of detail regarding their plan of procedure, excepting that they contemplate subletting all the dry excavation, and handle all the hydraulic dredge work themselves. Their construction office will probably be opened at Welland, Ontario, with Mr. A. German, their chief engineer, in charge.

Since our last notes were written the viaduct agreement was signed by the City of Toronto, Canadian Pacific Railway, and the Canadian National Railway, and the engineers have been busily engaged looking over the site making plans for spring work.

The past season has seen the greatest activity in sewer construction in Toronto and vicinity, and it looks as if greater activity will be obtained in 1925. Take for instance in the Township of East York alone, the following contractors are now at work: Goldie Construction Co.; H. M. Scott & Co.; W. R. Worthington Construction Co., Ltd.; John McGuire Construction Co.; Mohan & Jerou—all of Toronto; and in addition, McLaughlin Brothers of Ottawa. This is an indication of the way East York has developed from being a township to an up-to-date urban center. Mr. Grant R. Jack, the township engineer, is a busy man. Other contractors who have carried out big sewer jobs in the Toronto vicinity are: Dufferin Construction Co., Ltd.; J. H. McKnight Construction Co., Ltd.; A. Cavotti; W. E. Taylor; and A. McRae—all of whom have operated either in the city or in the immediate suburbs during the past season.

The usual representative contingent from Ontario will attend the Chicago Road Show, including the Government, Highways Department, Department of Lands and Forests, numerous county and city officials, and a large contingent of contractors.

Vancouver and Vicinity

BY J. C. MOON

The Grouse Mountain Highway and Scenic Resort Co. has been incorporated and intends to go ahead with its scheme of building a motor highway to the top of Grouse Mountain (about 3500 feet) and also the establishment of an hotel, etc., on the summit.

The City of Nanaimo plans to spend about $150,000 on waterworks improvements, chiefly in the form of trunk mains which will greatly improve the supply during the dry season.

Winnipeg and Vicinity

BY F. X. AMOSS

We are very pleased to announce that the Provincial Government of Manitoba has taken real action in improving the road between Emerson and Winnipeg. Contract has been let to the Great West Sand & Gravel Company for graveling this highway its whole length. About 2500 cubic yards of gravel will be used on each mile, all of which has to be carried by train from pits, north of Winnipeg. Mr. Harold Hutchings, who as President of the contracting firm in immediate charge of the work, advises actual operations will commence within thirty days.

Mr. Louis Pratt, president of the Coal Valley Mining Company, died very suddenly in Edmonton, on November 27th. His body was taken to Montreal for interment.

Mr. A. E. Sims has returned to Edmonton after attending a convention of steam shovel operators in Chicago.

Mr. McManus of Moose Jaw is making rapid progress on his contract for the construction of the subway under the Canadian National Tracks at Edmonton.

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TRADE NOTES

On Friday morning, November 28th, at the Memorial Hospital, Niagara Falls, John Lyell Harper, Vice-President and Chief Engineer of the Niagara Falls Power Company, passed away. Mr. Harper was born in Delaware County, New York, September 21, 1873. A mechanical engineer, a graduate of Cornell University, he devoted his life to the development of the water power of Niagara. He was an international figure in power development.

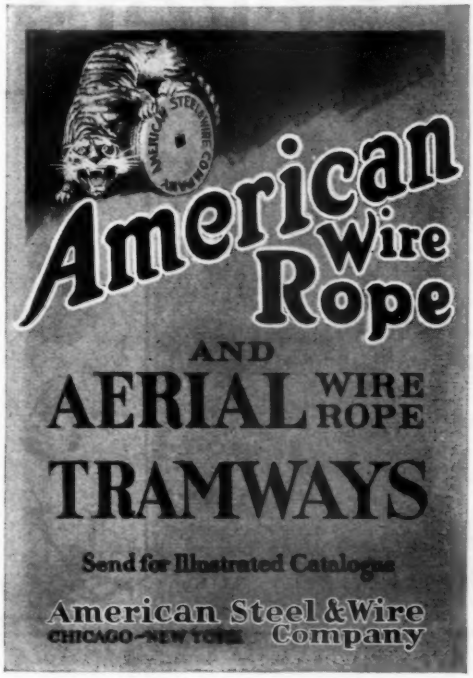
REVIEW OF BOOKS and CATALOGS | We shall be glad to review, in this column, such books and catalogs as are sent to us.

The Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., has prepared for publication, and will have ready for distribution early in January, a very interesting and attractive bulletin entitled "THE ENGINEERING ACHIEVEMENTS OF THE WESTINGHOUSE COMPANY DURING 1924." Space is given to recently developed large turbo-generator outfits, power house apparatus and stokers. Diesel electric drive for boats and electric locomotives are mentioned. Special motors for service in exposed places are described. The book is striking evidence of this corporation's aggressive policy in the field of electric power utilization. It may be obtained by application to them at *East Pittsburgh, Pennsylvania.*

SNOW INSURANCE — 8½ x 11 inches, 24 pages and cover, illustrated. A well-presented description of the Barber-Greene loader as applied to city snow removal. Write *Barber-Greene Co., Aurora, Illinois.*

"LUBRICATION OF CHAIN" — 6 x 9 inches, 21 pages, with loose-leaf type of binding. Illustrates and explains the manufacture, inspection, lubrication and care of "Tailormade" chains, with tabulated dimensions of steam shovel chains, dredge chains, derrick chains, sling or hoist chains, and the "missing link." This little book should be in the hands of every chain user. For your copy write *S. G. Taylor Chain Company, 140 South Dearborn Street, Chicago, Illinois.*

HISEY SLATE AND MARBLE DRILL — Bulletin No. 3018-S describes this new hand-drilling machine, which is equipped with Universal motor for operation on direct or alternating current. Ball bearings throughout. 110 r.p.m. on chuck spindle when running idle. For copy write the *Hisey-Wolf Machine Company, Cincinnati, Ohio.*



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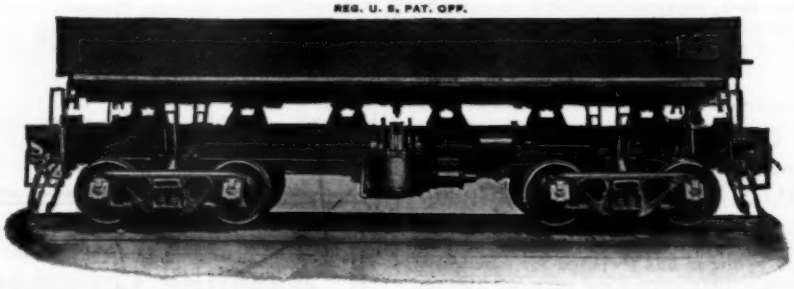

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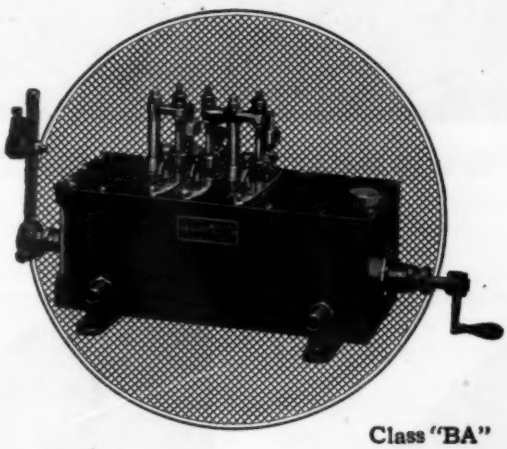

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The Bucyrus 30-B steam shovel overcasting. The fuel oil burned by the two shovels on this job was pumped to them through a two-inch pipe line two miles long. This saved a haul of twenty-two miles.

After the shovel had gone through. Note the fuel oil pipe lying in the foreground with the feed water line.

The type of rock through which the road was carved. Black powder was used to break up this material.

Views on the Oxnard-San Juan Capistrano Highway